



## Community-Based Ecotourism Development: A Sustainable Transition for Post-Palm Oil Plantation Land Use

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### ABSTRACT

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Post-palm oil plantation lands in Indonesia frequently encounter severe environmental degradation and limited post-productive utility. However, the emergence of the Society 5.0 era presents innovative opportunities for more productive and sustainable land management. This study aims to formulate a land-use transition strategy for post-palm oil areas by developing sustainable social ecotourism, integrating social, economic, and technological dimensions. A qualitative literature-based research design was employed, utilizing a multidisciplinary approach that encompasses institutional, technological, and economic perspectives. Data were analyzed through thematic and comparative analysis of diverse scientific sources and policy frameworks. The findings indicate that sustainable social ecotourism significantly enhances local community welfare, strengthens institutional frameworks, and supports environmental rehabilitation. Key success factors include the integration of digital technology and the enhancement of brand equity to boost destination competitiveness. Despite its potential, the transition faces critical challenges such as limited local capacity, unequal technological access, and fragmented stakeholder coordination. Overall, sustainable community based ecotourism serves as a viable land-use transition strategy for post-palm oil plantations, provided there is a strategic integration of technological innovation, institutional strengthening, and community empowerment.

### KEYWORDS:

Land use transition, post-palm oil plantations, community-based ecotourism, society era 5.0, sustainable development.

### 1. INTRODUCTION

As a cornerstone of Indonesia's tropical agricultural sector, palm oil serves as a strategic commodity in the global vegetable oil market. The transformation of this commodity from a traditional agricultural product into a major industrial driver reflects Indonesia's broader economic transition toward strengthening national economic resilience and fiscal stability. In the context of society era 5.0 paradigm, the integration of intelligent industrial systems is increasingly crucial for optimizing production efficiency and reducing logistical constraints across the supply chain (Haryanti et al., 2021). Therefore, technological advancement and industrial digitalization are essential to maintaining the long-term global competitiveness of Indonesia's palm oil industry.

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To remain competitive in the global market, Indonesia has continued to expand land allocation for oil palm cultivation. However, land previously utilized for oil palm plantations frequently experiences significant soil degradation, reducing its suitability for subsequent agricultural activities due to declining soil quality and the intensive application of chemical inputs during cultivation processes (Morrison et al., 2023). In addition, the Indonesian palm oil industry continues to face substantial sustainability governance challenges that require immediate governmental attention (Putri et al., 2022). These challenges are largely associated with ineffective governance structures and the insufficient application of sustainability principles under the Indonesian Sustainable Palm Oil (ISPO) framework, especially at the local and regional levels. Limited institutional capacity, weak coordination among stakeholders, and inadequate organizational resources continue to hinder the successful implementation of sustainable palm oil governance (Intan et al., 2022). Moreover, the establishment of more comprehensive regulatory frameworks is essential to mitigate the

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environmental and social consequences of oil palm plantation expansion while safeguarding public welfare. To address these challenges, the Indonesian government has introduced several policy measures, including legalization and amnesty-based approaches for illegal oil palm plantations operating within forest areas (Mardela et al., 2023).

Indonesia plays a significant role in global vegetable oil production, particularly as one of the leading producers of palm oil (Mohd Din et al., 2022). Palm oil is a key commodity that contributes substantially to the production and distribution of vegetable oils, with total output reaching 81.54 million metric tons in 2019. This condition highlights the strategic potential of palm oil in the development of agro-industrial sectors that significantly influence the national economy. However, despite its important contribution to economic and industrial growth, the expansion of oil palm plantations has also generated environmental challenges, including the degradation of previously cultivated land, which may reduce ecosystem quality. Therefore, sustainable alternative approaches are required, one of which is the development of community-based ecotourism. Community-based ecotourism refers to a tourism development strategy that combines environmental conservation efforts with active involvement of local communities. It is designed to create economic opportunities, strengthen social equity, and support the sustainable management of natural resources (Stone, 2015).

Given these conditions, it is essential to develop strategies aimed at restoring and sustainably managing former oil palm plantation areas through a sustainability-focused approach. Oil palm is a highly strategic plantation commodity that continues to expand and holds a crucial position in the national economy as a primary raw material for both the food and energy sectors. According to data from Statistics Indonesia (BPS), in 2022 the total oil palm plantation area reached 15.34 million hectares, distributed across 26 provinces, with Riau Province representing the largest share at 2.87 million hectares or approximately 18.70% of the national total (BPS Indonesia, 2023). However, in the same period, there were 2,030,848 hectares of immature plantations and 595,651 hectares of unproductive land, indicating significant challenges in optimizing plantation land use efficiency (BPS Indonesia, 2023).

The development of society era 5.0 represents a transformative paradigm that integrates digital technologies into human life, enabling intelligent systems to address complex social and economic challenges through a human-centered approach that combines physical and digital environments supported by artificial intelligence (Majid et al., 2023). In this context, Society 5.0 is characterized as an ecosystem that merges cyberspace and physical space to enhance human well-being and overcome real-world limitations through advanced digital integration (Zeb et al., 2022). Meanwhile, metaverse technology has emerged as a

real-time, three-dimensional virtual environment that facilitates seamless interaction between physical and digital realities (De Giovanni, 2023). Based on the above synthesis, society era 5.0 represents a transformative paradigm that integrates advanced digital technologies into human life to address complex social and economic challenges through a human-centered approach. It establishes an ecosystem in which physical and digital environments are merged, supported by artificial intelligence, to enhance human well-being and overcome various real-world limitations through advanced digital integration. Within this evolving framework, metaverse technology emerges as an extension of digital transformation, offering a real-time, three-dimensional virtual environment that enables seamless interaction between physical and digital realities.

Community-based ecotourism can serve as an alternative approach to utilizing natural resources to support regional resilience and sustainability. Through this approach, the sustainability of ecotourism development can be ensured. The ecotourism strategy proposed in this study can be developed based on Aaker's brand equity theory, particularly through brand association, which fosters socio-emotional relationships between the destination and local communities. This process is formed by creating a perception of transformation, where former oil palm plantation areas that were previously degraded, dry, and unproductive are converted into ecotourism sites that generate new ecological and socio-economic value. This transformation is further strengthened by the integration of modern technologies that are relevant to contemporary community activities.

Based on the background and theoretical review presented, this study focuses on formulating strategies for the utilization of former oil palm plantation land through the development of community-based ecotourism integrated with digital technology and a brand equity approach. This approach emphasizes the active participation of local communities in the planning, management, and development of ecotourism to ensure the achievement of sustainable economic, social, and environmental benefits. Therefore, the objective of this study is to analyze and formulate strategies for utilizing former oil palm plantation areas based on community-based ecotourism supported by technology and brand equity concepts, to promote environmental sustainability, improve community welfare, and strengthen local economic development.

## II. METHODOLOGY

The research methodology employed in this study consists of two main stages. The first stage involves a systematic literature review to collect secondary data from various academic sources, including peer-reviewed journals, books, and relevant publications related to oil palm plantations and ecotourism. This step aims to establish a strong theoretical foundation and to gain a comprehensive

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understanding of existing research on sustainable land use and community-based ecotourism. The second stage adopts a case study approach by examining selected examples of ecotourism implementation on former oil palm plantation areas in Indonesia. This approach provides practical insights into how the community-based ecotourism concept is applied in real-world contexts, particularly in relation to community participation, environmental restoration, and sustainable economic development.

### III. RESULTS AND DISCUSSION

Oil palm cultivation generally adopts a monoculture system that is highly vulnerable to pest and disease infestations (Ullyta et al., 2022). To enhance productivity, farmers frequently rely on inorganic fertilizers and chemical insecticides as primary solutions for pest control and yield improvement. Although the application of these chemical inputs can increase production in the short term, it also generates significant ecological impacts on plantation environments. Excessive use of chemical substances may lead to soil degradation, alterations in soil structure, and depletion of essential nutrients required for ecosystem sustainability (Greenshields et al., 2023). These conditions indicate that production enhancement through chemical-intensive approaches can simultaneously create new environmental challenges, particularly land degradation and declining ecological carrying capacity. Therefore, alternative approaches are needed that not only emphasize economic productivity but also prioritize environmental sustainability and the adaptive reuse of post-palm oil plantation land.

In the context of technological advancement and societal transformation in society era 5.0, technology utilization has become an innovative solution for revitalizing post-palm oil plantation land through sustainable and human-centered development approaches. One of the most relevant strategies is the implementation of community-based ecotourism as a sustainable transition model for post-palm oil land use, integrating environmental restoration, biodiversity conservation, and local economic empowerment. This approach transforms ecologically degraded plantation areas into multifunctional spaces that combine conservation, education, recreation, and socio-economic development. Furthermore, community-based ecotourism positions local communities as the primary stakeholders in the planning, management, and utilization of tourism resources, thereby encouraging participatory governance and strengthening community welfare through employment opportunities, micro-enterprise development, and cultural preservation. The integration of digital technology, smart tourism systems, and environmentally adaptive infrastructure can also enhance destination competitiveness, improve visitor experiences, and support sustainable resource management. Consequently, the development of community-based ecotourism on former palm oil plantation land represents not only an environmental

rehabilitation strategy but also a sustainable development model capable of promoting ecological resilience, inclusive economic growth, and long-term community empowerment in society era 5.0.

Ecotourism development on degraded post-palm oil plantation land represents a sustainable land-use strategy that integrates environmental restoration, biodiversity conservation, and local socio-economic development. Beyond serving as a recreational destination, ecotourism functions as an environmental education platform that enhances ecological awareness, promotes conservation initiatives, and encourages direct interaction between humans and nature. Ecotourism contributes to sustainable development through the integration of environmental protection, community participation, and economic diversification. Through this approach, degraded plantation areas can be transformed into multifunctional landscapes, such as biodiversity parks, ecological trails, conservation-based camping areas, and community-managed educational tourism facilities that support long-term environmental sustainability and economic resilience. Furthermore, community-based ecotourism strengthens local empowerment by generating employment opportunities, supporting small-scale entrepreneurship, and fostering collective responsibility for environmental conservation (Scheyvens, 1999). Consequently, ecotourism development on degraded plantation land serves not only as an ecosystem rehabilitation strategy but also as an inclusive and environmentally responsible regional development model.

In addition, the development of community-based ecotourism has significant potential to enhance the economic welfare of surrounding communities by creating inclusive and sustainable livelihood opportunities. Ecotourism has the potential to act as a driving force for local economic growth by generating employment opportunities, supporting the development of micro and small enterprises, and enhancing cooperation among various stakeholders in tourism destination areas. Scheyvens (1999) emphasizes that community participation in tourism development contributes not only to economic empowerment but also to social and psychological benefits, as local communities gain greater control over resources and decision-making processes. In this context, active community involvement combined with strong governmental support and enabling policy frameworks becomes a critical determinant in ensuring effective and sustainable resource management. Through collaborative governance mechanisms, ecotourism has the potential to convert degraded post-palm oil plantation areas into productive socio-ecological systems that foster new economic opportunities, enhance rural livelihood resilience, and support sustained environmental restoration over the long term.

The concept of brand equity proposed by Aaker (1991), can be effectively integrated into the development of

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community-based ecotourism to enhance destination competitiveness and sustainability. In the context of ecotourism development, the application of brand equity contributes to the creation of added value by strengthening destination identity, perceived quality, and emotional associations among stakeholders and visitors. Specifically, it plays a crucial role in building a positive image of post-palm oil plantation land transformation, shifting public perception from degraded and unproductive landscapes into attractive, functional, and sustainable tourism destinations. Through strategic branding, such landscapes can be repositioned as ecologically restored areas that offer unique tourism experiences while simultaneously supporting environmental conservation and socio-economic development. Furthermore, this approach helps to reframe existing negative stigmas associated with degraded plantation areas by highlighting their potential as productive socio-ecological spaces that generate economic benefits for local communities. As a result, the integration of brand equity within community-based ecotourism not only strengthens destination competitiveness but also supports long-term community empowerment and sustainable rural development.

In its practical implementation, post-palm oil plantation land can be redeveloped into an integrated tourism area that combines nature conservation principles with the application of modern technologies to support sustainable destination management. This transformation involves the strategic redesign of degraded landscapes into multifunctional ecotourism spaces that are environmentally restorative while remaining economically productive. Various supporting facilities can be developed, including camping areas, cycling trails, nature-based educational tourism zones, mini zoos, homestays, playgrounds, and thematic restaurants, all of which are designed to enhance visitor attraction and diversify tourism experiences.

Beyond providing recreational value, the development of such facilities aims to establish a sustainable tourism model that integrates environmental education, biodiversity conservation, and community-based economic development. The incorporation of interpretive education programs within nature tourism activities enables visitors to gain deeper awareness of ecological restoration and environmental stewardship. Meanwhile, the application of modern technologies, such as digital interpretation systems, smart tourism infrastructure, and interactive visitor experiences, can further enhance destination competitiveness and operational efficiency. Furthermore, this integrated approach supports the growth of the creative economy by involving local communities in tourism-related enterprises, including accommodation services, culinary businesses, handicrafts, and tour guiding activities. As a result, the transformation of former palm oil plantation areas into integrated ecotourism destinations not only contributes to environmental rehabilitation but also strengthens socio-economic resilience

at the local level through sustainable and inclusive tourism development.

Digital technology utilization can enhance ecotourism development by making it more innovative, competitive, and sustainable through the integration of visual technologies, interactive design, and modern technology-based elements that create immersive and distinctive tourism experiences. This innovation not only improves visitor experience quality but also strengthens destination identity and enhances perceived value of the developed ecotourism area. In addition, digital technologies enable more effective and engaging communication of conservation values and environmental education. Consequently, ecotourism is not limited to offering natural attractions but also provides a modern tourism experience that remains firmly grounded in environmental sustainability principles.

Furthermore, the development of community-based ecotourism on post-palm oil plantation land demonstrates that ecologically degraded areas still hold substantial potential for rehabilitation and transformation into sustainable and productive landscapes. This transformation is consistent with the fundamental principles of ecotourism, which highlight the combination of environmental protection, empowerment of local communities, and economic development based on natural resources. In this regard, active community participation plays a crucial role in ensuring the effective and sustainable management of tourism destinations, while also strengthening local ownership and stewardship of natural resources. In addition, the unique tourism concept developed on previously degraded land can foster positive brand associations among visitors, ultimately enhancing destination attractiveness and encouraging long-term loyalty. According to Aaker (1991), strengthening key dimensions of brand equity, such as brand associations and perceived quality, is essential in generating added value and achieving competitive advantage for tourism destinations. Therefore, the development of community-based ecotourism does not merely act as a tool for environmental restoration but also operates as a sustainable economic development approach that enhances community welfare through environmentally focused tourism activities.

Overall, the development of community-based ecotourism on post-palm oil plantation land represents a strategic approach to transforming degraded landscapes into productive and sustainable socio-ecological systems. This approach not only focuses on environmental rehabilitation but also positions local communities as key actors in the empowerment process through the integration of digital technologies, innovative destination management, and the strengthening of local resource-based economic capacities. Recent literature indicates that community-based ecotourism plays a significant role in increasing household income, diversifying livelihoods, and enhancing rural economic

resilience through direct community involvement in tourism activities (Rosalina, 2025).

Moreover, this model supports sustainable development by simultaneously integrating economic, social, and environmental dimensions, including strengthened community-based governance and environmental conservation practices (Djuwendah et al., 2023). In the context of post-palm oil plantation transformation, this approach is also aligned with ecosystem restoration efforts and land degradation reduction through the adaptive reuse of former plantation areas into inclusive and resilient ecotourism destinations (Judijanto, 2025). Therefore, the conversion of post-palm oil plantation land into community-based ecotourism areas can serve as a comprehensive strategy for achieving a balanced integration of economic growth, social sustainability, and long-term environmental restoration.

#### IV. CONCLUSION

The development of community-based ecotourism on post-palm oil plantation land represents a sustainable transition strategy that integrates environmental restoration, community empowerment, and technological innovation within a comprehensive development model. Land degradation caused by chemical-intensive palm oil cultivation practices can be transformed into an opportunity through ecotourism initiatives oriented toward environmental conservation, ecological education, and local economic development. Supported by technological advancements in society era 5.0, the revitalization of former palm oil plantation areas not only creates ecologically and economically valuable tourism destinations but also strengthens positive destination branding and encourages active community participation in achieving sustainable development goals.

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